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## EUROPEAN PATENT APPLICATION

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Double-purpose motor vehicle for cleaning roads and rail tracks, in particular of railways.

A double-purpose motor vehicle (1) is able to move both along roads and along rail tracks, particularly railway tracks.

According to the invention, the vehicle (1) comprises suction means (10) able to assume at least three working positions, in one of which they cooperate with the road and in another of which they cooperate with the rails (6), means (25, 41) being provided to enable said suction means (10) to undergo guided movement in correspondence with a bin-type body (8) associated with the vehicle (1) to which said suction means (10) are connected.

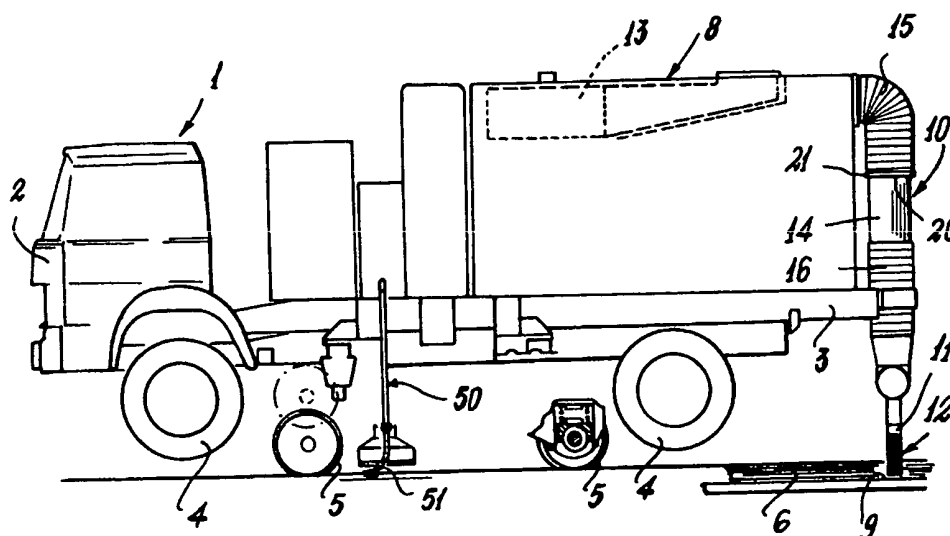


Fig. 1

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This invention relates to a motor vehicle able to move both along roads and along rail tracks, such as railway tracks. Such a vehicle will be known hereinafter as a double-purpose vehicle.

The problem of cleaning roads and railway tracks and ballast is well known.

This latter problem is most evident in very busy stations in which objects of very different dimensions are present on said ballast due to passenger carelessness, these including cigarette packets, pieces of paper, sticks, cigarette ends or the like.

Under these conditions, the ballast, which is usually cleaned manually, cannot be properly or even acceptably cleaned.

This is because manual cleaning allows only the larger-dimension objects (pieces of paper, cigarette packets) to be removed, whereas the smaller-dimension objects remain between the tracks.

An analogous problem exists on roads, where even after cleaning by the appropriate known vehicles, the small-dimension objects always remain within the cracks and holes in the road.

An object of the invention is therefore to provide a double-purpose vehicle of the stated type which is able to adequately clean both roads and rail tracks.

A particular object of the invention is to provide a vehicle of the stated type which is able to provide adequate cleaning of railway ballast by also removing small-dimension objects therefrom such as small sticks, cigarette ends and the like.

A further object is to provide a vehicle of the stated type which is of reliable operation and low cost.

These and further objects which will be apparent to the expert of the art are attained by a double-purpose motor vehicle of the aforesaid type, characterised by comprising suction means able to assume at least three working positions, in one of which they cooperate with the road and in another of which they cooperate with the rails, means being provided to enable said suction means to undergo guided movement in correspondence with a bin-type body associated with the vehicle to which said suction means are connected.

The present invention will be more apparent from the accompanying drawing, which is provided by way of non-limiting example and in which:

Figure 1 is a side view of the motor vehicle according to the invention;

Figure 2 is a schematic view of the rear of the vehicle of Figure 1, with some parts omitted for greater clarity;

Figure 3 is a rear view of the vehicle of Figure 1 with some parts shown in section for greater clarity;

Figure 4 is a side view of a part of the vehicle of Figure 1.

With reference to said figures, the motor vehicle according to the invention is indicated overall by 1 and comprises a driving cab 2, a floor 3, usual wheels for movement on roads and wheels 5 for movement along railway tracks.

The vehicle 1 is therefore of double-purpose type and can be switched from the configuration for movement on roads to the configuration for movement on railway tracks in known manner.

With the floor 3 there is associated a bin-type body 8 to which road cleaning suction means, track cleaning suction means and suction means for cleaning the railway ballast 9 are connected.

Specifically, a pipe 10 is associated with the body 8 and comprises at its free end 11 a brush 12 for cooperating with the road or the railway ballast, said pipe being connected to a usual suction generator 13 located within the body 8.

The pipe 10 comprises a rigid portion 14 partly slidable within an elbow tube 15 fixed to the body 8, and a flexible portion 16 terminating at said end 11.

At the mouth 20 of the tube 15 there are provided usual flexible seal members 21 which cooperate with the rigid portion 14 of the pipe 10.

This rigid portion is operationally connected via an arm 23 to the piston 24 of a cylinder-piston unit 25, the cylinder 26 of which is connected in known manner to the body 8.

The flexible portion 16 is connected to an arm 30 the end 32 of which is hinged at 31 to the rigid portion 14 of the pipe 10; said arm 23 acts on said end. The other end 33 of said arm 30 is connected to said portion 16 and to a shoe 34 slidable within a guide channel 35.

This latter is connected to elements 36 slidable within guides 37 fixed to the body 8.

The arm 30 is associated with a piston 40 (having its axis perpendicular to said piston 24) of a cylinder-piston unit 41, the cylinder 42 of which is connected to the piston 24 of the cylinder-piston unit 25 via a part 38 extending from said arm 23. The piston 40 carries at its free end an element 43 slidable along said arm 30 in such a manner as to remain always retained thereon.

With at least one of said elements 36 there is associated a grooved wheel 47 for cooperation with a corresponding rail 6.

The wheel 47 is carried by an arm 48 connected to said element 36. Alternatively, the arm 48 can be connected to the end 11 of the pipe 10.

A second pipe 50 passes into the body 8 and is connected to the suction generator 13.

The pipe 50 acts as a blowing pipe, its end 51 being arranged to cooperate with the upper end and the sides of each rail 6.

Advantageously, said pipe 50 can also be raised or lowered relatively to the ground by known means, not shown.

It will now be assumed that firstly the road and then a ballast 9 are to be cleaned.

For the first operation, the brush 12 is moved from a first working position in which it is raised, to another working position in which it cooperates with the road surface.

This is achieved by operating the cylinder-piston unit 35 (for example hydraulic, pneumatic or the like); assuming that the flexible portion 16 of the pipe 10 is coaxial with the rigid portion 14, the piston 24 of said cylinder-piston unit emerges from the cylinder 25 to drag said rigid portion 14 with it so that it emerges from the tube 15.

This occurs due to the action of the piston 24 on the arm 23, which extracts said portion 14 from the tube 15, hence lowering the end 11 of the pipe 10 (and thus the brush 12) towards the road surface.

The suction generator is now operated to achieve the desired cleaning.

To clean the ballast 9, the vehicle 1 is switched to the configuration for moving along the rails 6.

The pipe 10 is then lowered in the described manner so that the brush 12 is able to operate on a rail and on the ballast portion close to it.

During this lowering movement (as in the case of the already described lowering movement) the piston 24 operates indirectly, via the arm 30, shoe 34 and guide 35, on the elements 36 which slide within the respective guides 37 to emerge from them.

In this manner the lowering of the brush 12 onto the ballast also results in the lowering of the wheel 47, which makes contact with said rail 6.

The wheel 47 now guides the pipe 10 and the relative brush 12 in cleaning the ballast close to the chosen rail.

To now clean the ballast portion close to the other rail 6 by drawing in the objects present, the cylinder-piston unit 41 is operated so that the piston 40 slides into its cylinder 42.

In this manner, the arm connected to the flexible portion 16 of the pipe 10 moves from the position shown in Figure 3 to the position in which the brush 12 cooperates with the rail to the right of this figure.

Said movement (perpendicular to that for approaching the surface to be cleaned and along an axis parallel to this latter) is guided by the cooperation between the shoe 34 and the guide 35.

As the portion 16 of the pipe 10 is flexible, both the movements (along perpendicular axes), i.e. the movement of approach to the surface to be cleaned and the movement parallel to this surface, take place in a reliable manner.

In addition, by virtue of the "blowing" pipe 50 which operates on the rails 6 before the "suction" pipe 10 acts on them, excellent rail cleaning is also obtained.

In this respect, the blowing pipe 50 emits a powerful jet of air (or of water and/or of any known solvent) to detach anything which has been deposited on the rails 6, the suction pipe 10 then removing whatever has been detached from said rails.

A particular embodiment of the invention has been described. However, numerous modifications can be made thereto (such as to the guide for the flexible portion 16 of the pipe 10), but without leaving the scope of the present document.

### Claims

1. A motor vehicle able to move both along roads and along rail tracks, such as railway, tramway or similar tracks, characterised by comprising suction means (10) able to assume at least three working positions, in one of which they cooperate with the road and in another of which they cooperate with the rails (6), motor means (25, 41) being provided to enable said suction means (10) to undergo guided movements in correspondence with a bin-type body (8) associated with the vehicle (1) to which said suction means (10) are connected.
2. A motor vehicle as claimed in claim 1, characterised in that the suction means are a suction pipe (10) comprising a rigid portion (14) associated with and at least partially slidable within a tube (15) fixed to the body (8), and a flexible portion (16), said pipe (10) carrying at its free end (11) a member (12) for cooperating with the surface to be cleaned, means (30) being provided for stiffening the flexible portion (16) during the movement of said pipe (10).
3. A motor vehicle as claimed in claim 2, characterised in that the member for cooperating with the surface to be cleaned is a brush (12).
4. A motor vehicle as claimed in claim 2, characterised in that the means for stiffening the flexible portion (16) of the suction pipe (10) are an arm (30) hinged (at 31) at one end (32) to the rigid portion (14) of said pipe (10), the other end (33) of said arm (30) being secured to the flexible portion (16) of said pipe (10) and to means for guiding one of the possible movements of this latter.
5. A motor vehicle as claimed in claims 1 to 4, characterised in that the means for guiding the movement of the suction pipe (10) are a shoe

- (34) carried by the end (33) of the arm (30) secured to the flexible portion (16) of said pipe (10), said shoe being movable within a guide channel (35) connected to the body (8), said shoe (34) and said guide channel (35) enabling the brush (12) to move along an axis parallel to the surface (9) to be cleaned, elements (36) being associated with said channel (35) and slidable within guides (37) fixed to said body (8) to enable the brush (12) to move along an axis perpendicular to said axis parallel to the surface (9) to be cleaned.
6. A motor vehicle as claimed in claim 5, characterised in that the means for enabling the movements of the suction pipe (10) are hydraulic and/or pneumatic members.
7. A motor vehicle as claimed in claim 6, characterised in that a first motor means (25) provides a movement of approach to the surface to be cleaned, a second motor means (41) providing a movement perpendicular to the aforesaid movement, the first motor means being a cylinder-piston unit (25) having its piston (24) movable relative to a cylinder (26) and connected to the arm (30) for stiffening the flexible portion of the suction pipe (10), the second motor means being carried by said piston (24) and comprising a cylinder-piston unit (41) the piston (40) of which operates on said arm (30) via an element (43) slidable along said arm (30).
8. A motor vehicle as claimed in claim 7, characterised in that the movable piston (24) of the cylinder-piston unit (25) of the first motor means carries a support (23) to which there is fixed a support (38) for the cylinder (42) of the second motor means (41) within which the piston (40) of this latter moves.
9. A motor vehicle as claimed in claims 1 and 3, characterised by comprising, for the brush (12), guide means (47) arranged to cooperate with the rails (6) during the cleaning of the rails and of the railway ballast (9).
10. A motor vehicle as claimed in claims 5 and 9, characterised in that the guide means for the brush (12) are a grooved wheel (47) associated with an arm (48) connected to the guide channel (35) of the shoe (34) rigid with the arm (30) for stiffening the flexible portion (16) of the suction pipe (10).
11. A motor vehicle as claimed in claim 1, characterised by comprising blowing means (50) arranged to cooperate with the rails (6) for their cleaning.
12. A motor vehicle as claimed in claim 11, characterised in that the blowing means are a pipe (50) movable towards and away from the rails.
13. A motor vehicle as claimed in claims 2 and 11, characterised in that the suction pipe (10) and the blowing means (50) are connected to a suction generator (13) located in the body (8) of the vehicle (1).

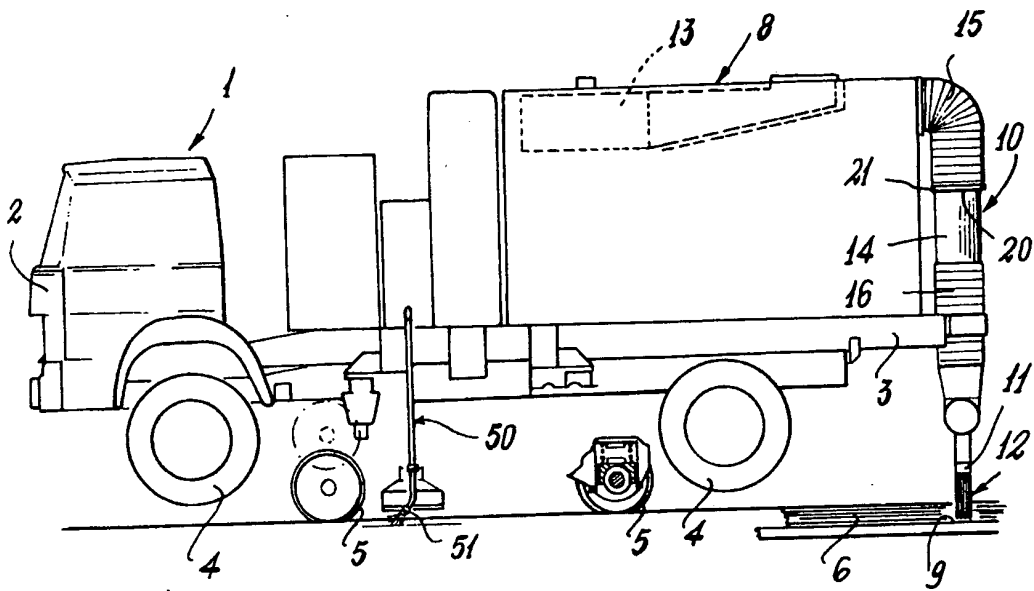


Fig. 1

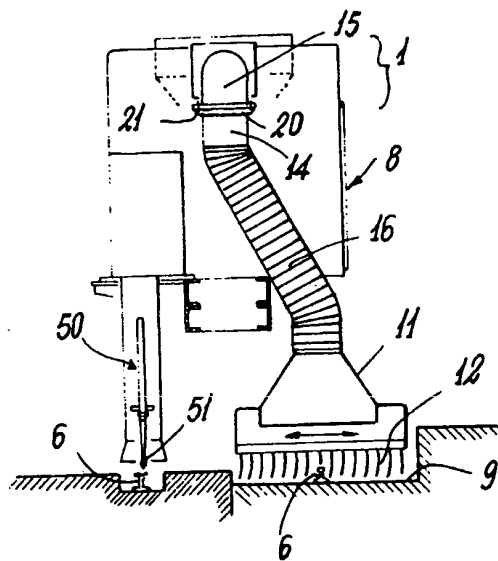
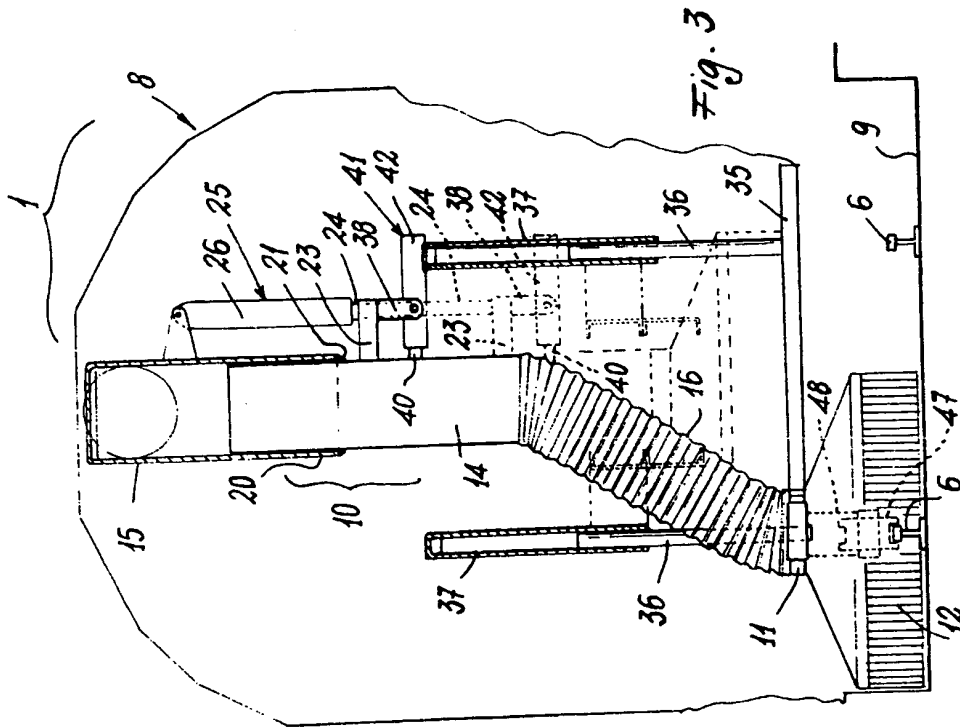
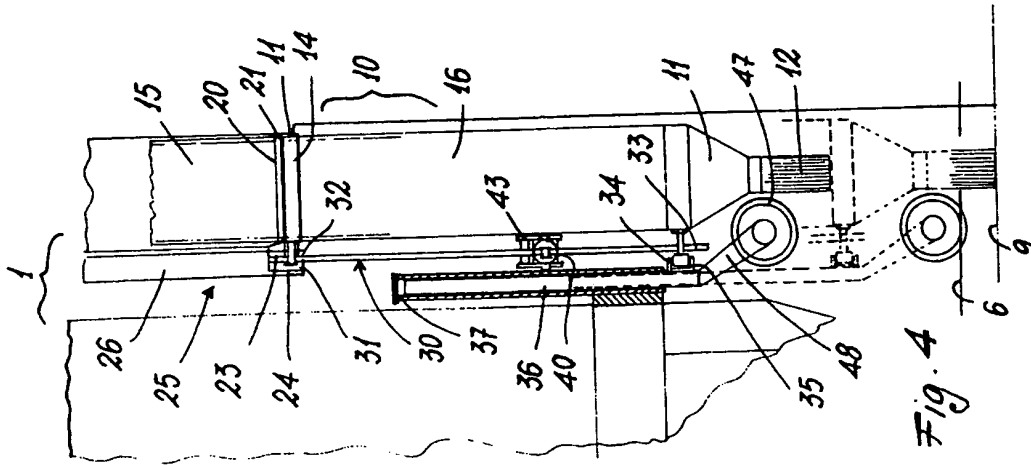


Fig. 2





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## EUROPEAN SEARCH REPORT

Application Number

EP 91 11 8581

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. CL.5)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
Y A	DE-A-3 318 756 (W. SCHNEIDER) * abstract; figures *	1, 11, 12 13	E01H1/08 E01H8/00
Y A	FR-A-2 408 691 (COSTA) * the whole document *	1, 11, 12 2, 6	
A	DE-A-2 217 975 (SCHÖRLING) * page - *	1, 9	
Y	GLASERS ANNALEN, vol. 100, no. 7/8, July 1976, BERLIN DE pages 240 - 247; HAHN: 'GLEISKRAFT-UND ZWEIWEGEFAHRZEUGE DER DEUTSCHEN BUNDESBahn' * page 246, right column, line 33 - page 247, right column, line 2; figures 11, 12 *	1, 11, 12	
Y A	CH-A-451 987 (ZWEIFEL) * the whole document *	1, 11, 12 13	
A	FR-A-378 167 (DEBAUGE) * the whole document *	3, 11, 13	TECHNICAL FIELDS SEARCHED (Int. CL.5)
			E01H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 31 JANUARY 1992	Examiner DIJKSTRA G.
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